U.S. FISH AND WILDLIFE SERVICE
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

SCIENTIFIC NAME: *Eurycea chisholmensis*

COMMON NAME: Salado salamander

LEAD REGION: 2

INFORMATION CURRENT AS OF: April 2010

STATUS/ACTION:

___ Species assessment - determined species did not meet the definition of endangered or threatened under the Act and, therefore, was not elevated to Candidate status

___ New candidate

_X_ Continuing candidate

___Non-petitioned

_X_ Petitioned - Date petition received: May 11, 2004

_ 90-day positive - FR date:

_ 12-month warranted but precluded - FR date:

_ Did the petition request a reclassification of a listed species?

FOR PETITIONED CANDIDATE SPECIES:

a. Is listing warranted (if yes, see summary of threats below)? Yes

b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? yes

c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded.

Higher priority listing actions, including court-approved settlements, court-ordered statutory deadlines for petition findings and listing determinations, emergency listing determinations, and responses to litigation, continue to preclude the proposed and final listing rules for Salado salamander. We continue to monitor Salado salamander populations and will change its status or implement an emergency listing if necessary. The "Progress on Revising the Lists" section of the current Candidate Notice of Review (CNOR) provides information on listing actions taken during the last 12 months.

___ Listing priority change

Former LP: ___

New LP: ___

Date when the species first became a Candidate (as currently defined): June 13, 2002

___ Candidate removal: Former LP: ___

___ A – Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.

___U – Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.

___ F – Range is no longer a U.S. territory.
__ I – Insufficient information exists on biological vulnerability and threats to support listing.
___ M – Taxon mistakenly included in past notice of review.
___ N – Taxon does not meet the Act's definition of "species."
___ X – Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Amphibian, Family Plethodontidae

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Texas

CURRENT STATES/ COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: Bell County, Texas

LAND OWNERSHIP: Big Boiling Springs is located in a municipal park in Salado, Texas. Robertson Springs is on private property.

LEAD REGION CONTACT: Sarah Quamme, (505) 248-6419, *Sarah_Quamme@fws.gov*

LEAD FIELD OFFICE CONTACT: Austin Ecological Services Field Office, Paige Najvar, (512) 490-0057, *Paige_Najvar@fws.gov*

BIOLOGICAL INFORMATION

Species Description: The Salado salamander (*Eurycea chisholmensis*) is entirely aquatic and neotenic (it does not metamorphose into a terrestrial adult). Adults are about 2 inches (5 centimeters) long. It has reduced eyes compared to other spring-dwelling *Eurycea* spp. in north central Texas and lacks well-defined melanophores (cells containing brown or black pigments called melanin) and iridophores (cells filled with iridescent pigments called guanine). It has a relatively long and flat head and a blunt and rounded snout. Three pairs of reddish-brown to bright red gills are located on each side of the neck behind the jaws. The upper body is generally grayish-brown with a slight cinnamon tinge and an irregular pattern of tiny, light flecks. The underside is pale and translucent. The posterior portion of the tail generally has a well-developed dorsal fin, but the ventral tail fin is weakly developed (Chippindale *et al*. 2000, p. 42).

Taxonomy: The U.S. Fish and Wildlife Service (Service) has carefully reviewed the available taxonomic information and has concluded that this species is a valid taxon. A description of the Salado salamander was published by Chippindale *et al*. (2000, pp. 40-43). The three known salamander species that occur in the Northern Segment of the Edwards Aquifer have very similar external morphology. Because of this, they were previously believed to be the same species; however, molecular evidence strongly indicates that there is a high level of divergence between the three groups (Chippindale *et al*. 2000, pp. 15-16). All three of these species, including the Salado salamander belong to the genus *Eurycea* within the Tribe Hemidactyliini. Tribe Hemidactyliini are differentiated from other Tribes in the Family Plethodontidae by having aquatic larvae. Plethodontid salamanders comprise the largest family of salamanders within the Order Caudata and are characterized by an absence of lungs (Petranka 1998, pp. 157, 158).

Habitat/Distribution: Bell County has approximately 14 very small (0.028 to 0.28 cubic feet per second (cfs)) to large (280 to 2,800 cfs) springs (Brune 1981, pp. 65-69). The Salado salamander is known historically from two spring sites near Salado, Bell County, Texas: Big Boiling Springs (also known as Main, Salado, or Siren Springs) and Robertson Springs (Chippindale *et al*. 2000, p. 43). These springs bubble up through faults in the Northern Segment of the Edwards Aquifer and associated limestones along Salado Creek (Brune 1975, p. 31). Both are considered small to medium springs, depending on flow, by Brune's (1981, p. 69) definition.

Population Estimates/Status: The current population status of the Salado salamander is unknown. Biologists were unable to observe this species in its type locality despite over 20 visits to Big Boiling Springs that occurred between 1991 and 1998 (Chippindale *et al*. 2000, p. 43). Likewise, TPWD surveyed this site weekly from June 2009 until May 2010 and found one salamander (Gluesenkamp, TPWD, pers. comm., 2010b) at a spring outlet locally referred to as "Lil'Bubbly" located just upstream from Big Boiling Springs. One Salado salamander was also reportedly observed in Big Boiling Springs in 2008 by a citizen of Salado, Texas. In 2009, Texas Parks and Wildlife Department (TPWD) was granted access to Robertson Springs to survey for the Salado salamander. This species was reconfirmed at this location in February 2010 (Andy Gluesenkamp, TPWD, pers. comm., 2010a). In August 2009, TPWD also discovered a population of salamanders at a new site in Bell County, Texas. Studies are underway to determine if this species is the Salado salamander or another aquatic salamander species.

Other spring sites may have Salado salamanders, but the Service has no confirmed information on other springs with Salado salamanders. Other spring sites (Big Bubbly Springs, Critchfield Springs, Happy Daze Fish Camp Springs, and Anderson Springs) are located downstream from Big Boiling Springs and Robertson Springs. TPWD has surveyed these springs periodically since June 2009, but no salamanders have been found (Andy Gluesenkamp, TPWD, pers. comm., 2010a).

THREATS:

We have no new information as of April 2010 regarding threats to the species.

A. The present or threatened destruction, modification, or curtailment of its habitat or range. *Water quality degradation*: The range of the Salado salamander is limited to a group of springs collectively known as Salado Springs along Salado Creek in and near the Village of Salado in Bell County, Texas (Price *et al*. 1999a, p. 2). A portion of the Salado Creek watershed is located in Williamson County, Texas. This area is experiencing rapid human population growth. Although most of Bell County is still considered rural, population projections from the Texas State Data Center (2009, p. 19) estimate that Bell County will increase in population from 237,974 in 2000 to 397,741 in 2040 . The Salado salamander's restricted range within an urbanized area makes it vulnerable to both acute and chronic groundwater contamination and potentially catastrophic hazardous materials spills.

As human population growth and urbanized development increases, more opportunities exist for the chronic, long-term introduction of non-point source pollutants into the environments. For example, the ongoing application of pesticides and fertilizers to lawns is a constant source of pollutants (Menzer and Nelson 1980, pp. 663, 637-652). Petroleum products are also inherent components of urban environments from automobile operation and maintenance (Van Metre *et al*. 2000, p. 4,069). During rain events, these chemical pollutants, which accumulate in soils and on impervious surfaces (such as roofs, parking lots, and roads) during dry periods, are transported by water downstream into areas where salamanders occur. This process can occur either through direct surface water runoff or through infiltration into groundwater that later discharges through springs (Schram 1995, p. 91). Acute short-term increases in pollutants, particularly sediments, can occur during construction of new development. When vegetation is removed and rain falls on unprotected soils, large discharges of suspended sediments result and can have immediate effects of increased sedimentation in downstream drainage channels (Schueler 1987, p. 1.4; City of Austin (COA) 2003, p. 24).

Amphibians, especially their eggs and larvae (which are usually restricted to a small area within an aquatic environment), are sensitive to many different aquatic pollutants (Harfenist *et al*. 1989, pp. 4-57). Contaminants found in aquatic pollutants may interfere with a salamander's ability to develop, grow, or reproduce (Burton and Ingersoll 1994, pp. 120, 125). In addition, macroinvertebrates, such as small freshwater crustaceans, that aquatic salamanders feed on are especially sensitive to water pollution (Phipps *et al*. 1995, p. 282; Miller *et al*. 2007, p. 74). Studies in the Bull Creek watershed in Austin, Texas found a loss of some sensitive macroinvertebrate species, potentially due to nutrient enrichment and sediment accumulation (COA 2001b, p. 15).

Increases in impervious cover resulting from urbanization have been shown to cause measurable water quality degradation (Klein 1979, p. 959; Bannerman *et al*. 1993, pp. 251-254, 256-258; Center for Watershed Protection 2003, p. 91). Impervious cover in a stream's watershed causes streamflow to shift from predominately baseflow, which is derived from natural filtration processes and discharges from local groundwater supplies, to predominately stormwater runoff. Stormflows carry pollutants and contaminants into stream systems (Bannerman *et al*. 1993, pp. 251-254, 256-258; Schueler 1994, p. 102; Barrett and Charbeneau 1996, p. 87; Center for Watershed Protection 2003, p. 91). With increasing stormflows, the amount of baseflow available to sustain water supplies during drought cycles is diminished and the frequency and severity of flooding increases. The increased quantity and velocity of runoff increases erosion and streambank destabilization, which in turn leads to increased sediment loadings, channel widening, and detrimental changes in the morphology and aquatic ecology of the affected stream system (Hammer 1972, pp. 1535-1536, 1540; Booth 1990, pp. 407-409, 412-414; Booth and Reinelt 1993, pp. 548-550; Schueler 1994, pp. 106-108; Pizzuto *et al*. 2000, p. 82; CWP 2003, pp. 41-48).

Elevated mobilization of sediment (mixture of sand, silt, clay, and organic debris) also occurs as a result of increased velocity of water running off impervious surfaces in the urban environment (Schram 1995, p. 88; Arnold and Gibbons 1996, pp. 244-245). Increased rates of storm water runoff cause erosion by scouring in headwater areas and sediment deposition in downstream channels (Booth 1991, pp. 93, 102-105; Schram 1995, p. 88). Sediments are washed into streams or aquifers during storm events. Sediments are either deposited into layers or become suspended in the water column (Ford and Williams 1989, p. 537; Mahler and Lynch 1999, p. 13). Sediment derived from soil erosion has been cited by Menzer and Nelson (1980, p. 632) as the greatest single source of pollution of surface waters by volume. Due to high organic carbon content, sediments eroded from contaminated soil surfaces can concentrate and transport contaminants (Mahler and Lynch 1999, p. 1). Sediment can affect aquatic organisms in a number of ways. Sediments suspended in water can clog gill structures, which impairs breathing of aquatic organisms, and can reduce their ability to avoid predators or locate food sources due to decreased visibility (Schueler 1987, p. 1.5).

Excessive deposition of sediment in streams can physically reduce the amount of available habitat and protective cover for aquatic organisms, by filling the interstitial spaces of larger substrates (such as gravel and rocks) surrounding the spring outlets that offer protective cover and an abundant supply of well-oxygenated water for respiration. As an example, a California study found that densities of two salamander species were significantly lower in streams that experienced a large infusion of sediment from road construction after a storm event (Welsh and Ollivier 1998, pp. 1,118-1,132). The vulnerability of the salamander species in this California study was attributed to their reliance on interstitial spaces in the streambed habitats (Welsh and Ollivier 1998, p. 1,128). The loss of interstitial spaces in stream substrates can be measured as the percent embeddedness. Embeddedness reflects the degree to which rocks (which provide cover for salamanders) are surrounded or covered by fine sediment. Increased sedimentation from urban development is a water quality threat to the Salado salamander because it fills interstitial spaces and eliminates resting places and also reduces habitat of its prey base (small aquatic invertebrates) (COA 2006, p. 34).

Excessive nutrient input to watershed drainages is another form of pollution that occurs in highly urbanized areas. Sources of excessive nutrients (elements or compounds, such as phosphorus or nitrogen, that fuel abnormally high organic growth in aquatic ecosystems) in water include human and animal wastes, municipal sewage treatment systems, decaying plant material, and fertilizers used on croplands (Garner and Mahler 2007, p. 29). Excessive nutrient levels typically cause algal blooms that ultimately die back and cause progressive decreases in dissolved oxygen concentration in the water from decomposition (Schueler 1987, pp. 1.5-1.6). Increased nitrate levels, which are often associated with fertilizer use, have been known to affect amphibians by altering feeding activity and by causing disequilibrium and physical abnormalities (Marco *et al*. 1999, p. 2,837).

Polycyclic aromatic hydrocarbons (PAHs) are another form of aquatic pollution in urbanized areas that could potentially affect Salado salamanders, their habitat, or their prey. PAHs can originate from petroleum products, such as oil or grease, or from atmospheric deposition from the byproducts of combustion (for example, vehicular combustion). These pollutants are widespread and can contaminate water supplies through sewage effluents, urban and highway runoff, and chronic leakage or acute spills of petroleum and petroleum products from pipelines (Van Metre *et al*. 2000, p. 4,067, Albers 2003, pp. 345-346). Petroleum and petroleum byproducts can adversely affect living organisms by causing direct toxic action, altering water chemistry, reducing light, and decreasing food availability (Albers 2003, p. 349). PAH exposure can cause impaired reproduction; reduced growth and development; and tumors or cancer in species of amphibians, reptiles, and other organisms (Albers 2003, p. 354). PAHs are also known to cause death, reduced survival, altered physiological function, inhibited reproduction, and changes in Georgetown salamander populations and community composition of freshwater invertebrates (Albers 2003, p. 352).

The Northern Segment of the Edwards Aquifer is at risk for spillage of hazardous materials in transport. Interstate Highway 35, a major artery that serves as a transport route for hazardous materials, crosses the watershed that contributes water to spring sites historically known to be occupied by the Salado salamander. Spring openings are also located on either side of Interstate Highway 35 (Brune 1981, p. 68). A catastrophic spill could occur if a transport truck overturned and its contents entered the recharge zone of the Northern Segment of the Edwards Aquifer. Transportation accidents involving hazardous materials spills at bridge crossings are of particular concern because recharge areas in creek beds can transport contaminants directly into the aquifer. Any hazardous materials spill within the vicinity of Big Boiling or Robertson springs could have the potential to threaten the long-term survival and sustainability of the Salado salamander.

Several groundwater contamination incidents have occurred within Salado salamander habitat (Price *et al*. 1999b, p. 10). Big Boiling Springs is located on the south bank of Salado Creek in a municipal park, near where past contamination events have occurred (Chippindale *et al*. 2000, p. 43). Between 1989 and 1993, at least four incidents occurred within a quarter mile from both spring sites, including a 700 gallon and 400 gallon gasoline spill and petroleum leaks from two underground storage tanks (Price *et al*. 1999b, p. 10). Although groundwater contamination is of great concern, we have no information to indicate what effect this had on the species or its habitat.

In addition to threats from groundwater contamination from increasing urbanization, the Salado salamander is also threatened by habitat modification of its spring sites. Most of the spring outlets in the City of Salado, including the type locality at Big Boiling Springs, have been modified during the past 150 years by dam construction in the mid-1800s, to supply power to various mills, and a stone wall to keep out cattle (Brune 1981, p. 67). The Service is also aware of habitat modification at Big Boiling Springs in the summer of 2008, when the Village of Salado covered a spring opening with gravel due to safety concerns. Although we received anecdotal information that at least one salamander was observed at the site after the gravel was dumped at Big Boiling Springs, the Service has no detailed information on how the Salado salamander was affected by this action.

Human population growth and urbanization within Bell and Williamson Counties continue to increase steadily. Urbanization can dramatically alter the hydrologic regime and water quality of watershed drainages (Klein 1979, p. 959; Bannerman *et al*. 1993, pp. 251-254, 256-258; CWP 2003, p. 91). The known range of the Salado salamander is entirely located in the City of Salado. Therefore, we consider the destruction or modification of habitat due to acute or chronic water quality degradation or hazardous materials spills in the Northern Segment of the Edwards Aquifer to be a threat to the Salado salamander now and in the foreseeable future.

Water quantity and spring flow declines: Future climate change could affect water quantity and spring flow for this aquatic species. According to the Intergovernmental Panel on Climate

Change (IPCC 2007, p. 1), "warming of the climate system is unequivocal, as is now evident from observations of increases in global averages of air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level." Localized projections suggest the southwest United States may experience the greatest temperature increase of any area in the lower 48 states (IPCC 2007, p. 8), with warming increases in southwestern states greatest in the summer. The IPCC also predicts hot extremes, heat waves, and heavy precipitation will increase in frequency (IPCC 2007, p.8).

Effects from climate change on aquifer-dependant species can be difficult to assess. This is because (1) there is little data available to correlate groundwater trends and climate change and (2) groundwater typically represents an integration of past climatic conditions over many years due to its time within an aquifer system (Mace and Wade 2008, p. 657). Although recharge, pumping, natural discharge, and saline intrusion of groundwater systems could be affected by climate change (Mace and Wade 2008, p. 657), we lack sufficient information to know how climate change will affect spring flows within Salado salamander habitat. The Service will continue to investigate this matter as new information becomes available in future years.

B. <u>Overutilization for commercial, recreational, scientific, or educational purposes</u>. We are not aware of any information regarding overutilization of Salado salamanders for commercial, recreational, scientific, or educational purposes and do not consider this a significant factor threatening this species now or in the foreseeable future.

C. <u>Disease or predation</u>. We are not aware of any information regarding disease or predation of Salado salamanders and do not consider this a significant factor threatening this species now or in the foreseeable future.

D. <u>The inadequacy of existing regulatory mechanisms</u>. The Salado salamander is not listed on the Texas State List of Threatened or Endangered Species (Texas Parks and Wildlife Department [TPWD] 2010, pp. 2-3). Therefore, it is receiving no direct protection from the State. Under authority of the Texas Administrative Code (Title 30, Chapter 213), the Texas Commission on Environmental Quality (TCEQ) regulates activities having the potential for polluting the Edwards Aquifer and hydrologically connected surface streams (TCEQ 2001, pp. 1-14). Although implementation of the Edwards Rules in other areas of the Northern Segment of the Edwards Aquifer may have the potential to affect conditions at spring sites occupied by the Salado salamander, the jurisdiction of TCEQ does not extend into Bell County. Moreover, the regulations do not address land use, impervious cover limitations, non-point source pollution, or application of fertilizers and pesticides over the recharge zone (30 TAC 213.3). We are unaware of any water quality ordinances more restrictive than TCEQ in Bell County.

Human population growth and urbanization within Bell and Williamson counties continue to increase. Existing regulations do not address many of the sources of groundwater pollution that are typically associated with urbanized areas. Therefore, we conclude that the protections from the existing regulatory mechanisms are not adequate to limit or alleviate the threats to the Salado salamander.

E. <u>Other natural or manmade factors affecting its continued existence</u>. We are not aware of any information regarding other natural or manmade factors affecting the Salado salamanders' continued existence. Therefore, we have determined that there are no other natural or manmade factors significantly affecting this species now or in the foreseeable future that constitutes a threat to the Salado salamander.

CONSERVATION MEASURES PLANNED OR IMPLEMENTED: TPWD is working to find additional populations of the species. Texas Department of Transportation (TxDOT) is planning to re-build and widen a portion of Interstate Highway 35 upstream from Big Boiling Springs. The Service has been coordinating with TxDOT in 2009 and 2010 about this project and what measures TxDOT can take to improve the status of the Salado salamander. TxDOT worked with TPWD in 2009 to gain access to a number of private properties in Bell County to survey for previously unidentified populations of the Salado salamander. We anticipate that our coordination with TxDOT and TPWD to outline conservation measures for this species will continue. There are currently no other known conservation activities being planned or implemented for the Salado salamander.

SUMMARY OF THREATS (Including reasons for addition to or removal from candidacy, if appropriate): The primary threat facing the Salado salamander is the degradation of the water quality that feeds the springs that support habitat for this species. The restricted range of the salamander makes it vulnerable to catastrophic hazardous materials spills, groundwater contamination from the Northern Segment of the Edwards Aquifer, and impacts to its surface habitat. In addition, conservation strategies have not yet been planned or implemented for the Salado salamander. The Service finds that this species continues to be warranted for listing throughout all of its range. We therefore find that it is unnecessary to analyze whether it is threatened or endangered in a significant portion of its range.

For species that are being removed from candidate status:

____Is the removal based in whole or in part on one or more individual conservation efforts that you determined met the standards in the Policy for Evaluation of Conservation Efforts When Making Listing Decisions (PECE)?

RECOMMENDED CONSERVATION MEASURES: The Service recommends developing and implementing comprehensive regional plans to address water quality threats. A plan to protect or enhance water quality should include measures for projects constructed over contributing and recharge zones of the Northern Segment of the Edwards Aquifer. Such measures should include impervious cover limits, buffer zones for streams and other sensitive environmental features, low-impact developments, structural water quality controls and other strategies to reduce pollutant loads. Land preservation through acquisition, conservation easements, or deed restrictions also can provide permanent protection for water quality and quantity. Programs should be developed to reduce pollutant loading from already existing development and other potential sources of pollutants such as golf courses and transportation infrastructure. Partnerships should be formed with the landowners of the spring sites and efforts should be made to protect the surface habitat of the salamander. The Barton Springs Salamander Recovery Plan (Service 2005, pp. 2.1-1-2.1-6) outlines conservation measures in more detail. The measures set forth in this recovery plan were developed to protect another aquatic species in the Barton Springs Segment of the Edwards Aquifer, but many of these could be applied to the Salado salamander as well. Also, the Salado salamander is a high priority species in the Wildlife Action Plan of Texas (TPWD 2005, p. 748). This may help in securing State funds for both research and conservation efforts for this species. Also, landowners within the possible range of the Salado salamander should be contacted and surveys should be conducted.

LISTING PRIORITY:

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
High	**Imminent**	Monotypic genus	1
		Species	2*
		Subspecies/population	3
	Non-imminent	Monotypic genus	4
		Species	5
		Subspecies/population	6
Moderate to Low	Imminent	Monotypic genus	7
		Species	8
		Subspecies/population	9
	Non-imminent	Monotypic genus	10
		Species	11
		Subspecies/population	12

Rationale for listing priority number:

Magnitude: Limited distribution of this species makes it extremely vulnerable to extinction from degradation of water quality. We find this threat is of a high magnitude because a single spill could be catastrophic.

Imminence: This species occurs in a rapidly growing region of the United States, making the degradation of water quality an imminent threat of total habitat loss. In fact, several contaminant spills have already occurred near both known locations for the Salado salamander.

_X__ Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed? Yes

Is Emergency Listing Warranted? No. There is not enough information on the Salado salamander to determine what protective measures could be put in place with an emergency listing to preclude its extinction.

DESCRIPTION OF MONITORING: TPWD has been surveying Robertson Springs and Big Boiling Springs weekly from June 2009 to March 2010 (Andy Gluesenkamp, TPWD, pers. comm., 2010a). TPWD also has conducted periodic surveys of various spring sites downstream from Robertson Springs and Big Boiling Springs from June 2009 to March 2010 (Andy Gluesenkamp, TPWD, pers. comm., 2010a). Since these monitoring efforts began, a small number of Salado salamanders have been discovered at Robertson Springs for the first time in over 20 years (Andy Gluesenkamp, TPWD, pers. comm., 2010a). Another population of salamanders was discovered at a new locality in Bell County, Texas. Studies are being conducted to determine if this is the Salado salamander or another aquatic salamander species (Andy Gluesenkamp, TPWD, pers. comm., 2010a). The Service has received no other reports of Salado salamander sightings at this time.

COORDINATION WITH STATES: In March 2010, Andy Gluesenkamp, State Herpetologist for TPWD assisted in this assessment by providing information on surveying and monitoring efforts initiated in 2009 for this species (Andy Gluesenkamp, TPWD, pers. comm., 2010a).

Indicate which State(s) did not provide any information or comments: N/A

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APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve: ______________________________ May 21, 2010

Acting Regional Director, Fish and Wildlife Service Date

Concur: ______________________________ Date: October 22, 2010

ACTING

Director, Fish and Wildlife Service

Do not concur: ______________________________ ______________

Director, Fish and Wildlife Service Date

Director's Remarks:

Date of annual review: April 2010

Conducted by: Paige Najvar, Austin Ecological Services Field Office